

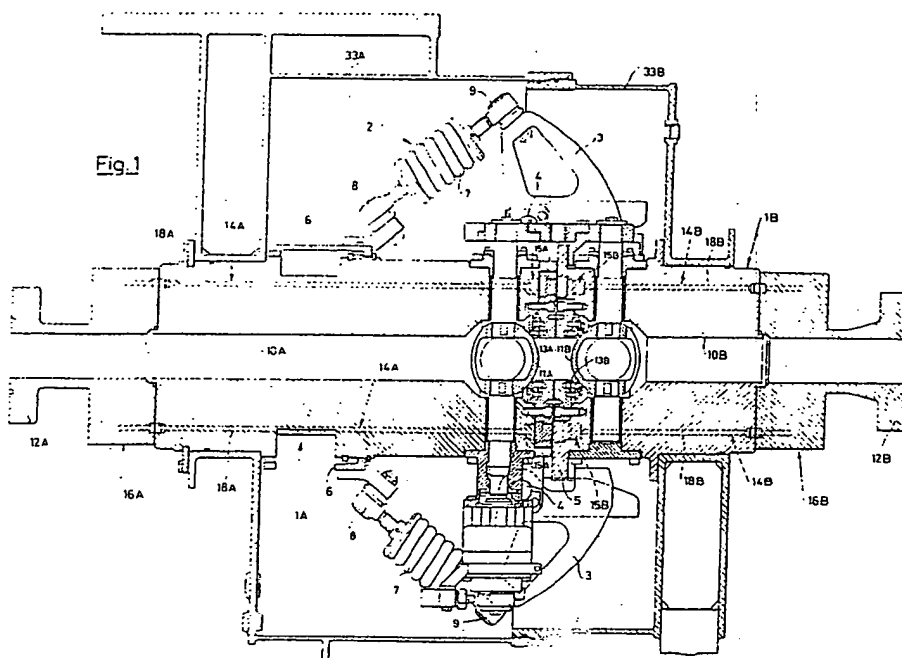
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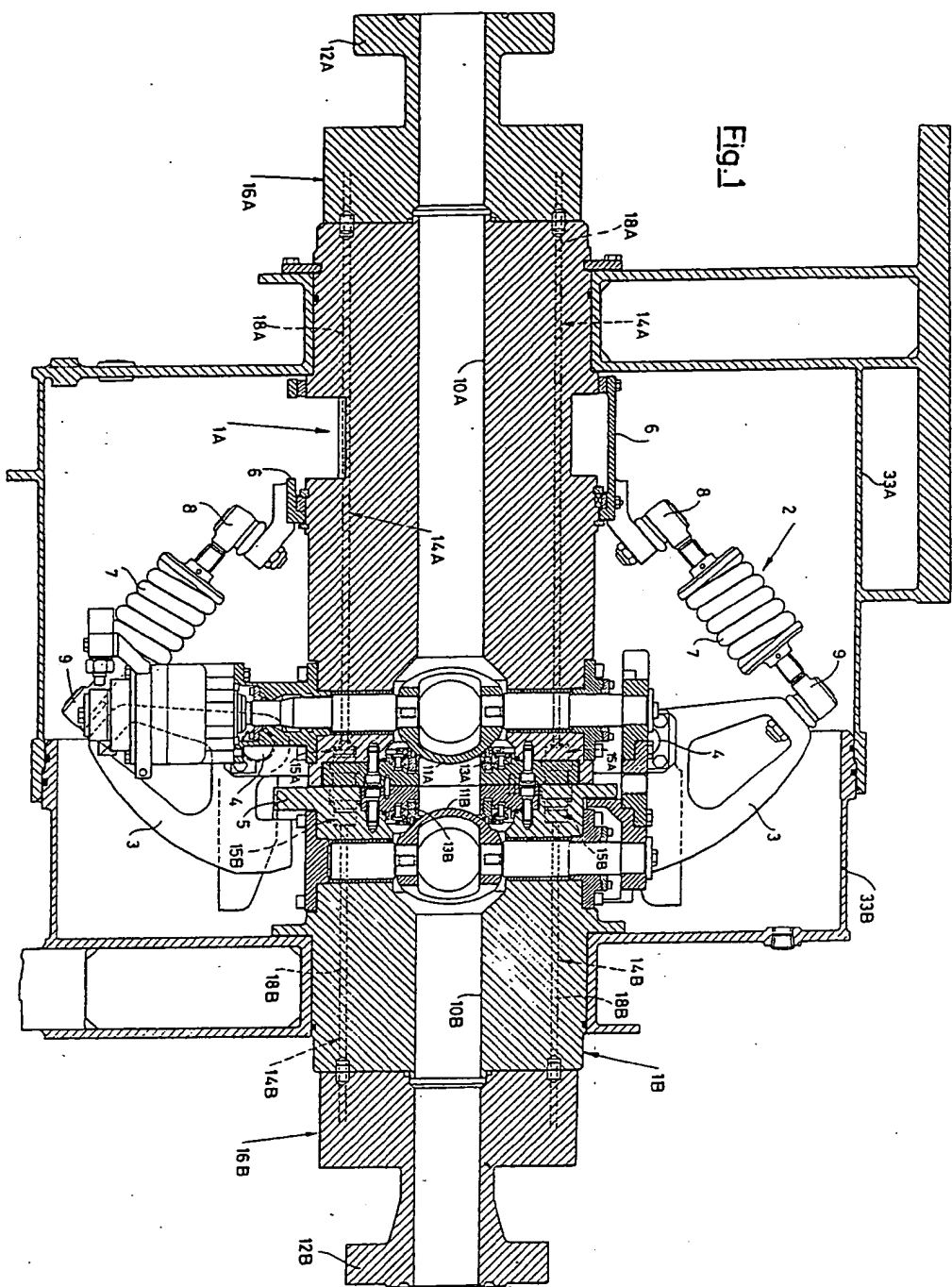
## (54) Quick-connection device for hydraulic pipes

(57) The device is divided into two parts 1A, 1B which can be abutted and clamped to one another by a quick-drive clamping system 2. A main pipe 10A, 10B and one or more hydraulic and/or electric service lines e.g. 14A, 14B, pass through the parts 1A, 1B. In the abutted position, both the main pipe and the service lines of one part are connected to the

corresponding pipes of the other part. The service lines are provided with automatic cut-off means, e.g. 15A, 15B, for the fluid or current flow. The clamping system comprises a plurality of clamping jaws 3 rotatably pivoted at 4, said jaws engaging an end flange 5 when in the closed position. The clamping system further comprises a rotatable ring 6 and a plurality of elastic rods 7 for connecting the ring to the jaws.



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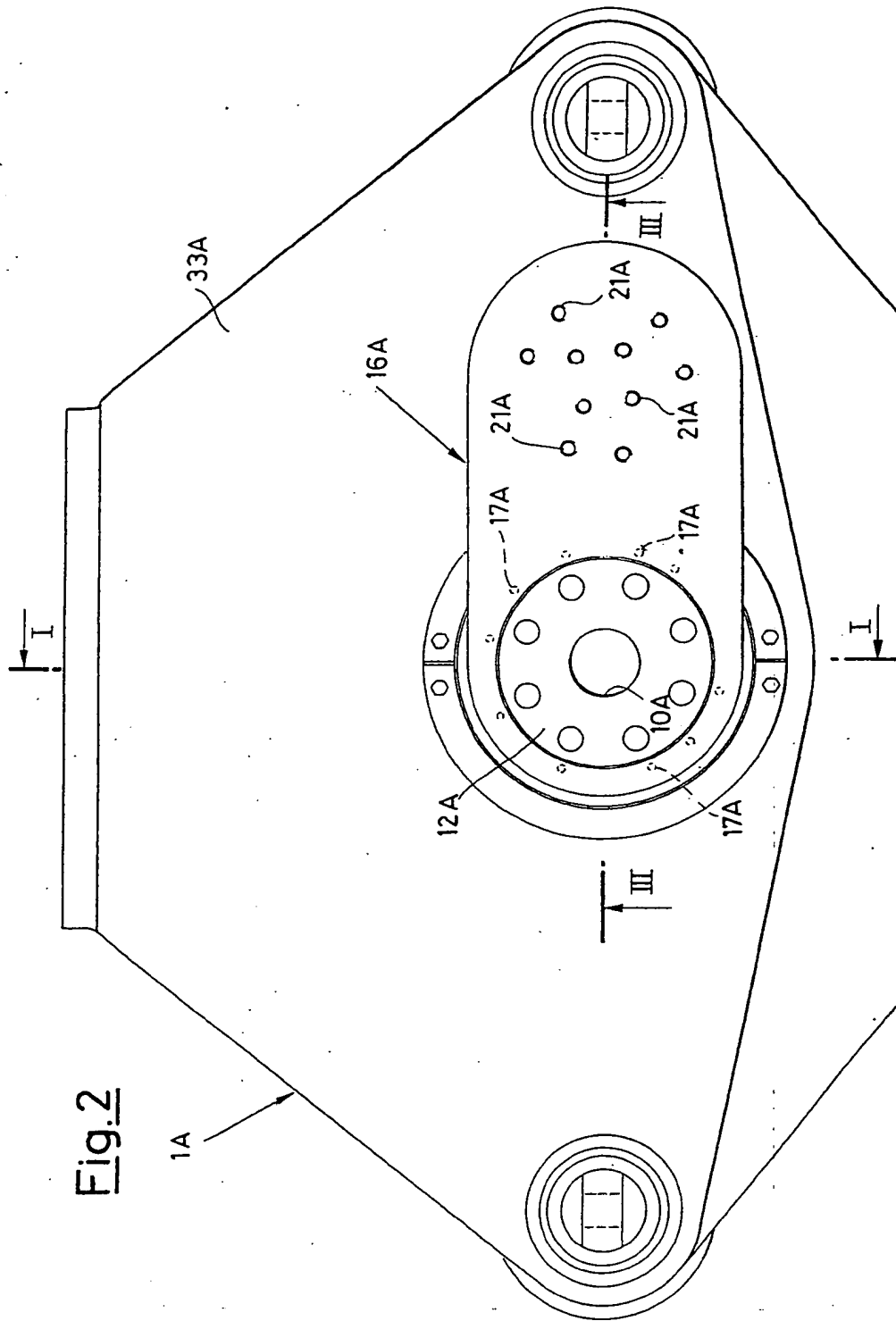


Fig. 2

1A

16A

12A

17A

10A

21A

17A

21A

21A

17A

33A

I

III

III

Fig. 4

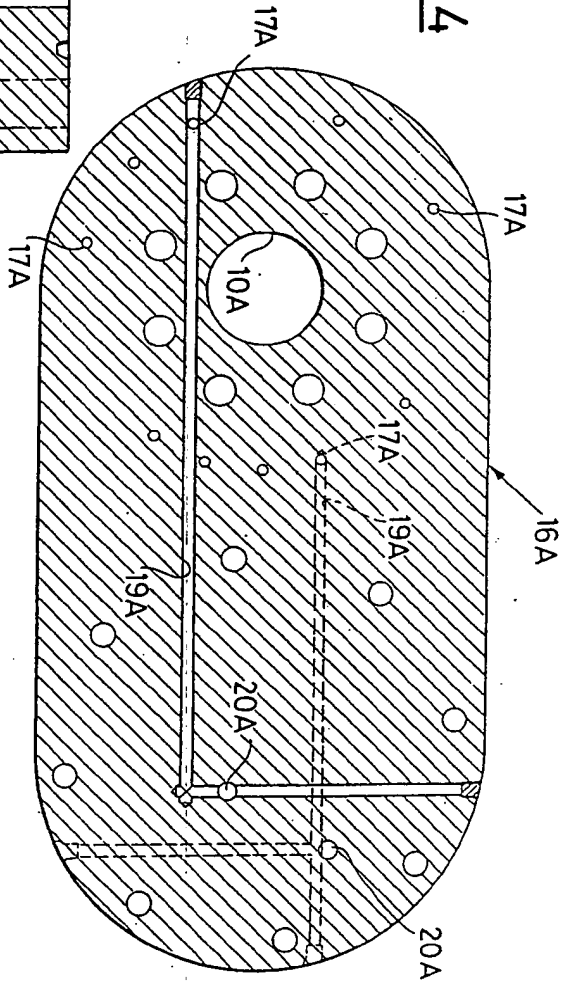


Fig. 3

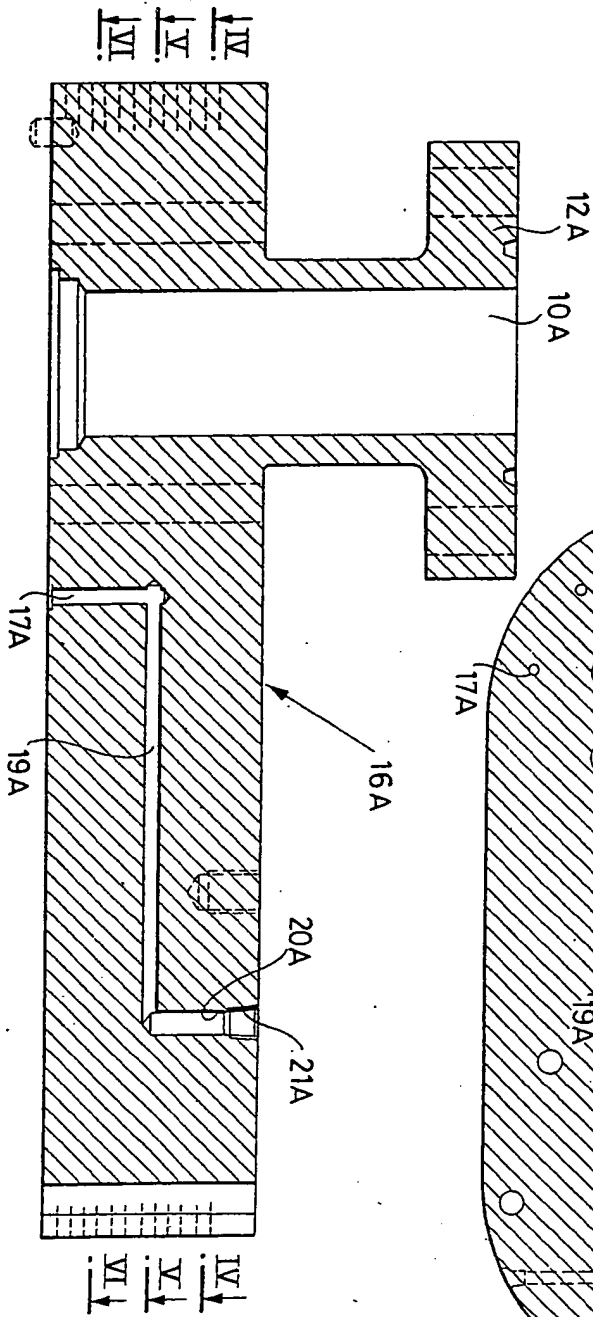


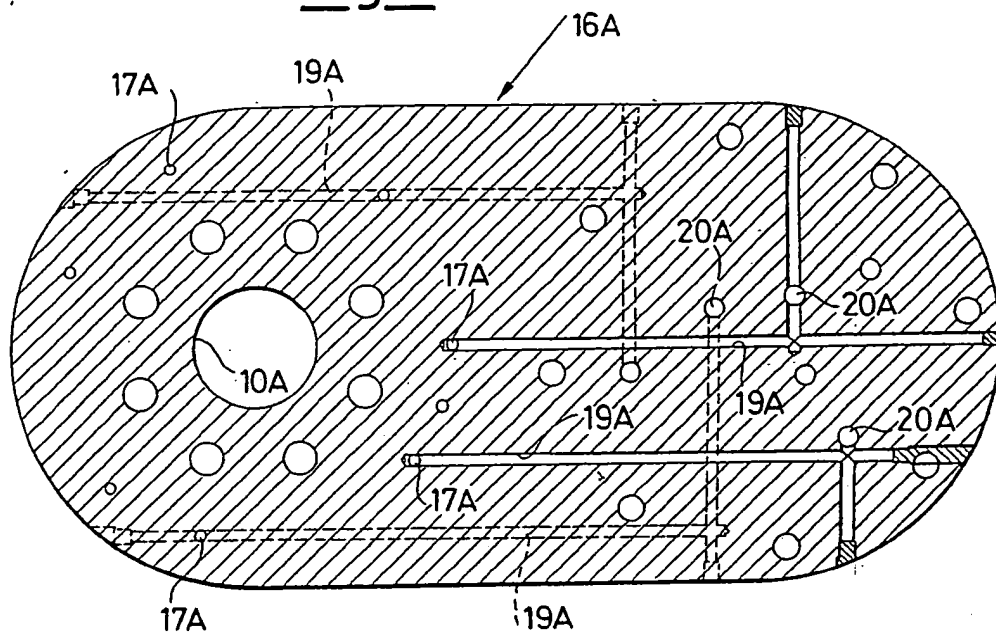
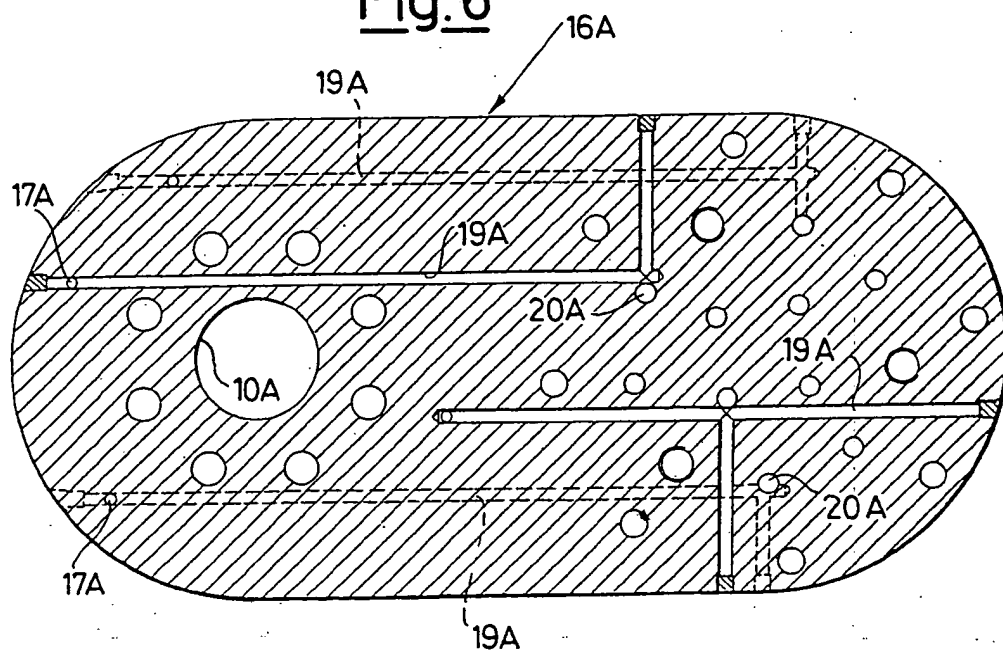
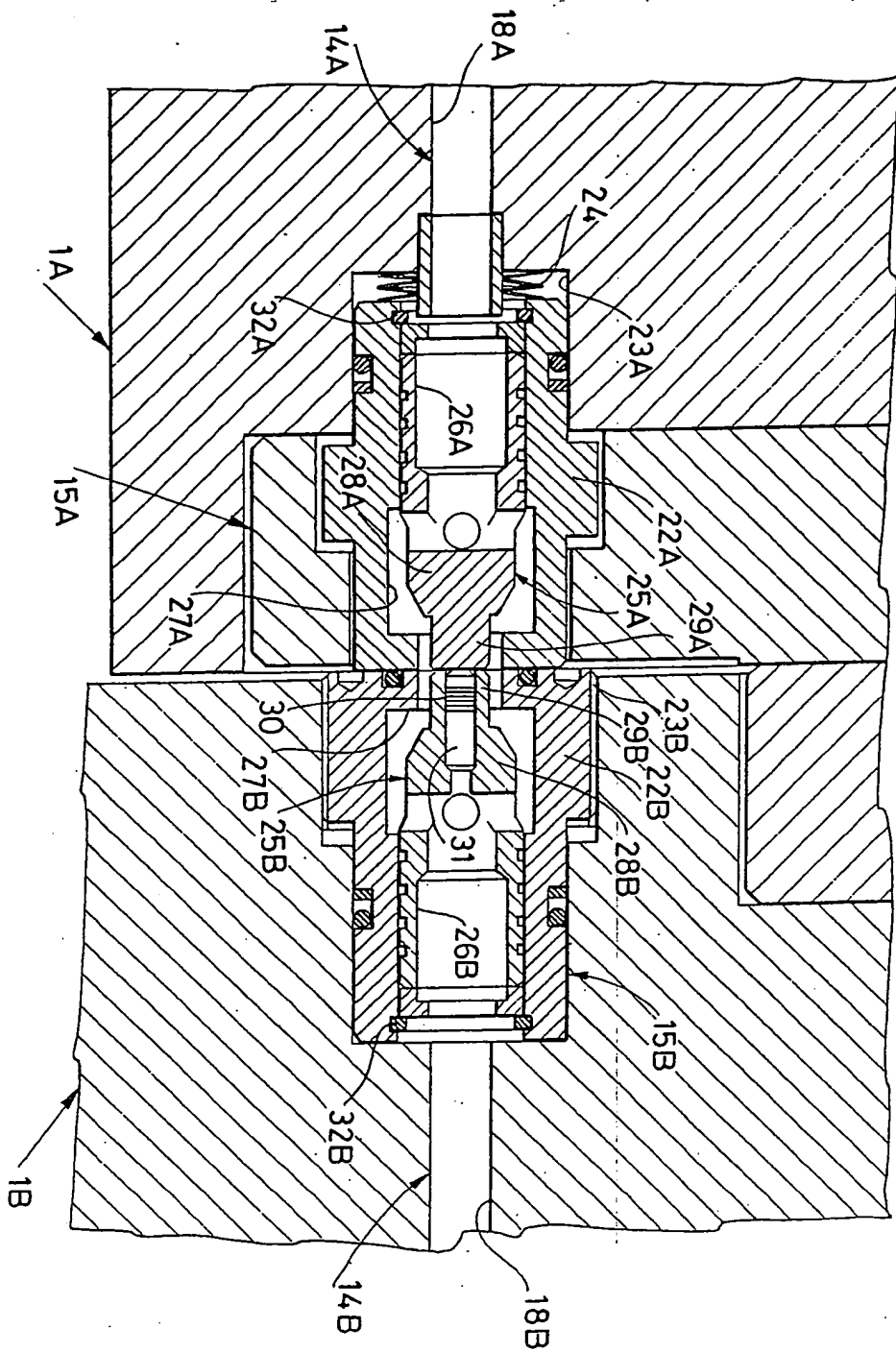
Fig. 5Fig. 6

Fig. 7



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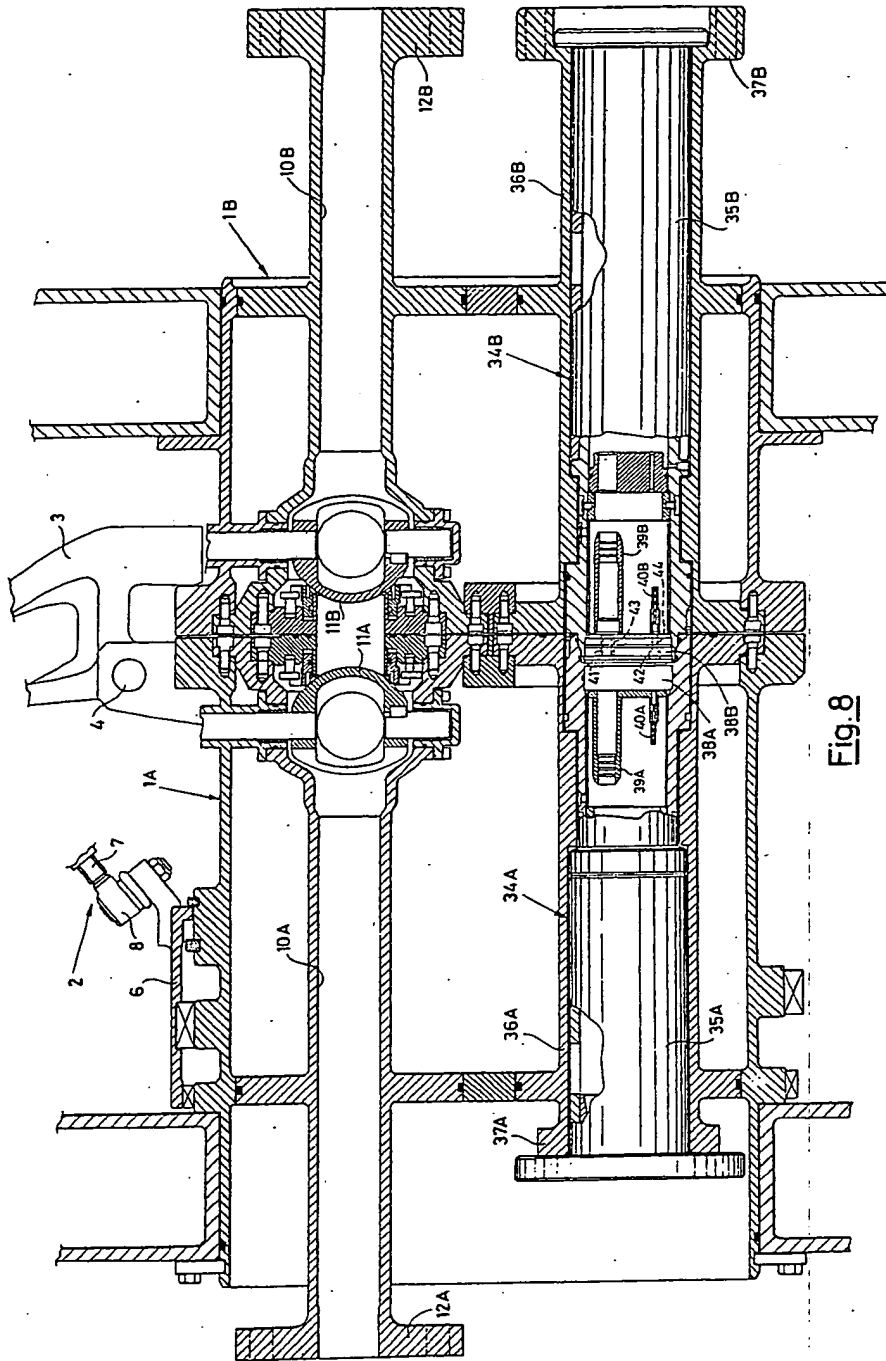


Fig. 8

## SPECIFICATION

## Quick-connection device for hydraulic pipes and associated hydraulic and electric service lines

5 The present invention relates to a quick-connection device for hydraulic pipes and associated hydraulic and electric service lines.

There are already known quick-connection devices for hydraulic pipes, in which quick-drive clamping means provide, when asked, to clamp in frontally abuted position two parts passed through by respective pipes which can be aligned with one another. A similar device is illustrated, for example, in the Italian patent No. 844.387, in the name of the same Applicant of the present application.

Such devices are particularly used for the transfer of fluid oil products from a ship to earth or viceversa, within seaports or in high sea, near drilling platforms. Besides they can be kept out of water, as well as on the sea-floor, in this latter case there being obviously necessary special sealtight envelopes that surround and close the connection area.

25 Apart the problem of the quick connection of the main pipe, there exists also the problem of the connection of the various hydraulic and/or electric service lines, which accompanies the main pipe and are presently subjected to connections of conventional kind, independent from the quick-connection system.

The object of the present invention is to realize a connection device, which not only allows the quick connection (or separation) of the main pipe, but assures at the same time the automatic connection (or separation) of one or more service lines of hydraulic and/or electric kind.

According to the invention such an object is reached by a quick-connection device, comprising a first part and a second part releasably clamped in end-to-end abuted position and quick-drive clamping means restrained to one of said parts and releasably connectable to the other of said parts for their clamping in said end-to-end position, everyone of said parts being passed through by a main pipe provided with check-valve, which at the abutment front of said parts has a connectable free end in direct continuation of the corresponding free end of the main pipe of the other part, as a result of the clamping of said parts in said end-to-end position, characterized in that everyone of said parts is also passed through by at least one hydraulic or electric service line, which at least at said abutment front is parallel to said main pipe and connectable in direct continuation of the corresponding service line of the other part when said parts are clamped in said end-to-end position, said service line being provided with means able to realize and interrupt automatically the fluid or, respectively, current flow which passes through said line, when said parts are

65 therefore possible to carry out with a single operation both the quick connection of the main pipe and that, obviously equally quick, of the accompanying service line or lines; naturally the same thing happens in the release step.

70 In the matter is particularly important the fact that the service line or lines, are they hydraulic or electric, are provided with means able to realize and interrupt automatically the fluid or current flow which passes through them. In fact this is an essential feature to allow to operate also the connection or separation of the service line or lines with the same single manoeuvre usually foreseen for the connection or separation of the main pipe. Otherwise there will be necessary further operations, which would make the device according to the invention much less useful.

The features of the present invention will be made more evident by the following detailed description of two embodiments illustrated by way of non-limitative examples in the enclosed drawings, in which:

Fig. 1 shows a first example of the device according to the invention in axial section along line I—I of Fig. 2;

90 Fig. 2 shows said device as seen from left with respect to Fig. 1;

Fig. 3 shows a detail of said device in section along line III—III of Fig. 2;

Fig. 4 shows the same detail in section along line IV—IV of Fig. 3;

Fig. 5 shows the same detail in section along line V—V of Fig. 3;

Fig. 6 shows the same detail in section along line VI—VI of Fig. 3;

100 Fig. 7 shows in axial section the enlarged detail of the coupling carried out in an hydraulic service line in the device of Fig. 1;

Fig. 8 shows in axial section a second example of the device according to the invention.

105 The device illustrated in Fig. 1—7 is realized for the quick connection of a main hydraulic pipe and of a plurality of hydraulic service lines.

It is constituted by two parts 1A and 1B, which inside two sealtight, connectable casing parts 33A, 33B can be releasably clamped to one other in end-to-end position (Fig. 1) by a quick-connection clamping device 2, which is of the kind described in the previously mentioned Italian patent No. 844.387. The device 2 comprises a plurality of clamping jaws 3 rotatably pivoted at 4 on the part 1A so as to be rotatable in different radical planes between an open position and the closed position of Fig. 1, in which they are coupled to an end flange 5 of the part 1B to clamp this latter against the front of the part 1A; besides it comprises a rotating ring 6 carried by the part 1A too and a plurality of elastic rods 7, with end joints 8 and 9, which connect individually to the rotating ring 6 the various jaws 3, the opening and closing of which is thus determined by the rotation, opportunely controlled, of the ring. 6



movable sealing seat 13A, 13B (Fig. 1). One end of said pipe is arranged at a terminal flange 12A, 12B, located in central position (Fig. 2), which allows the connection of the same pipe to one of the two pipes connected through the device of Fig. 1, while the other end, with the two parts 1A and 1B end-to-end positioned and clamped to one another as in Fig. 1, is aligned and in free communication with the corresponding end of the main pipe of the other part of the device. Everyone of said parts 1A, 1B is also passed through by a plurality of hydraulic service lines 14A, 14B, which in their turn automatically result in mutual connection when the two parts 1A, 1B are abuted and mutually clamped as in Fig. 1. Said hydraulic service lines extend at most parallel to the main pipe 10A, 10B with circumferential arrangement with respect to the same from the connection end, which is provided with a closure valve means 15A, 15B which will be described hereinafter with reference to Fig. 7, then move laterally inside an elliptical section plate 16A, 16B disposed parallel to the central terminal flange 12A, 12B and finally come out from said plate at holes 21A, 21B arranged in grouped position and laterally displaced as shown in Fig. 2. Through the above mentioned holes 21A, 21B the service lines 14A, 14B are connectable to lines of various kind associated to the two locations to be connected. The proceeding of said service lines inside the respective plate 16A, 16B is clearly shown in Figs. 3—6: in particular it includes a short axial section 17A, 17B arranged as a continuation of the corresponding long section 18A, 18B, a longer transversal section 19A, 19B which brings outwards from the previous section 17A, 17B, and finally another short axial section 20A, 20B, removed from the main pipe 10A, 10B, which leads to the respective outlet hole 21A, 21B (Fig. 3).

As previously said, the connected ends of the service lines 14A, 14B, that is those opposed to the outlet holes 21A, 21B, are provided with respective closure valve means 15A, 15B. A pair of said valve means, cooperating with each other, are illustrated in details in Fig. 7 and comprise, as regards the valve means 15A, an outer body 22A housed in an axially sliding way in a fixed seat 23A and here stressed by a spring 24 and an inner body 25A housed in its turn in axially sliding way in the outer body 22A and passed through by an inner passage 26A able to put into communication the respective service line 14A with an inner enlarged chamber 27A of the outer body 22A, which can be closed by an extreme head 28A of the inner body 25A, which is provided with a projecting tooth 29A. The valve means 15B is substantially the same (the same numbers with letter B indicating in Fig. 7 the parts corresponding to those of the valve means 15A), except that there is not provided a pressure spring and there is provided, on the contrary, a calibrated check valve 30, inserted in an end continuation 31 of the inner passage 26B of the inner body 25B in order to release possible overpressures in the service line

14B (intended as that to be connected to a pressurized hydraulic part).

Such a constitution of the valve means 15A, 15B, with the two parts 1A, 1B abuted and clamped as in Fig. 1, allows the spring 24 to force the outer body 22A against the outer body 22B and consequently, through a gasket 32A, the inner body 25A against the inner body 25B, retained in its turn by a gasket 32B. The two inner bodies 25A, 25B are thus retained in a back position, which allows the two chambers 27A, 27B to communicate with one another and thus to put into communication, by the passage 26A, 26B, the respective service lines 14A, 14B.

In case of mutual release and removal of the two parts 1A and 1B, on the other hand, the same pressure fluid causes the advancement of the two inner bodies 25A, 25B, which, no more retained by one another, provide to close the two terminal chambers 26A, 26B. The two lines 14A, 14B thus remain closed and there is no leakage of product.

During the reconnection step, on the contrary, the same abutting engagement between the two parts 14A, 14B, which is realized by the quick-connection device, obliges the two inner bodies 25A, 25B to move back to restore the communication, and therefore the fluid flow, between the two lines 14A, 14B.

With a single manoeuvre is thus possible to realize, in addition to the connection or separation of the main pipe 10A, 10B (controlled by the respective ball valve 11A, 11B), not only the connection or separation of the service lines 14A, 14B but also the corresponding release or interception of the fluid flow between one line and the other.

The device illustrated in Fig. 8 is, basically analogous to that just described, from which it differs only in that, instead of the various hydraulic service lines 14A, 14B extending from the elliptical plates 16A, 16B, there is provided in every part 1A, 1B a single electric service line 34A, 34B able to be connected and separated automatically from the corresponding line of the other part of the device at every connection and, respectively, separation of the two parts 1A, 1B.

As a matter of fact, the line 34A is formed by a tubular sheath 35A, which is inserted inside a tubular channel 36A provided with end flange 37A, and by a connection head 38A provided with couplings 39A and 40A for electric wires (not illustrated) which are made sliding inside the sheath 35A and with pins 41 and 42 which can be inserted into corresponding sockets 43 and 44 of the connection head 38B of the line 34B (otherwise identical to the previous one and therefore marked with the same reference numbers).

Even in this case, when the connection or separation of the two parts 1A and 1B is operated, there also occurs automatically the connection or, respectively, the separation of the two lines 34A and 34B with the equally automatic realization or interception of a current flow from one line and the other.

## CLAIMS

1. Quick-connection device for hydraulic pipes and associated hydraulic and electric service lines, comprising a first part and a second part
- 5 releasably clamped in end-to-end abuted position and quick-drive clamping means restrained to one of said parts and releasably connectable to the other of said parts for their clamping in said end-to-end position, everyone of said parts being
- 10 passed through by a main pipe provided with check-valve, which at the abutment front of said parts has a connectable free end in direct continuation of the corresponding free end of the main pipe of the other part, as a result of the
- 15 clamping of said parts in said end-to-end position, characterized in that everyone of said parts is also passed through by at least one hydraulic or electric service line, which at least at said
- 20 abutment front is parallel to said main pipe and connectable in direct continuation of the corresponding service line of the other part when said parts are clamped in said end-to-end position, said service line being provided with means able to realize and interrupt automatically the fluid or,
- 25 respectively, current flow which passes through said line, when said parts are disposed in said end-to-end position or, respectively, removed from it.
2. Device according to claim 1, characterized in that everyone of said parts is passed through by a
- 30 plurality of hydraulic service lines circumferentially arranged around the main pipe at least at said abutment front, far from this latter said lines being laterally deviated until reaching a grouped arrangement laterally displaced with respect to
- 35 the main pipe.
3. Device according to claim 2, characterized in that said lines in grouped arrangement end with corresponding holes provided in a plate face extending laterally with respect to the main pipe.
- 40 4. Device according to claim 2, characterized in that said lines end at said abutment front with holes provided with valve means able to open and close automatically said holes as a result of the connection and, respective, the separation of said
- 45 parts.
5. Device according to claim 1, characterized in that everyone of said parts is passed through by at least one electric service line provided with end
- 50 pin or socket means for the connection to corresponding end pin or socket means of the electric line of the other part.

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